

Appendix:

**Community Resilience
Planning Example –
Riverbend, USA**

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GOAL OF APPENDIX:

Provide an example of a fictional city working through each of the six planning steps of the Guide

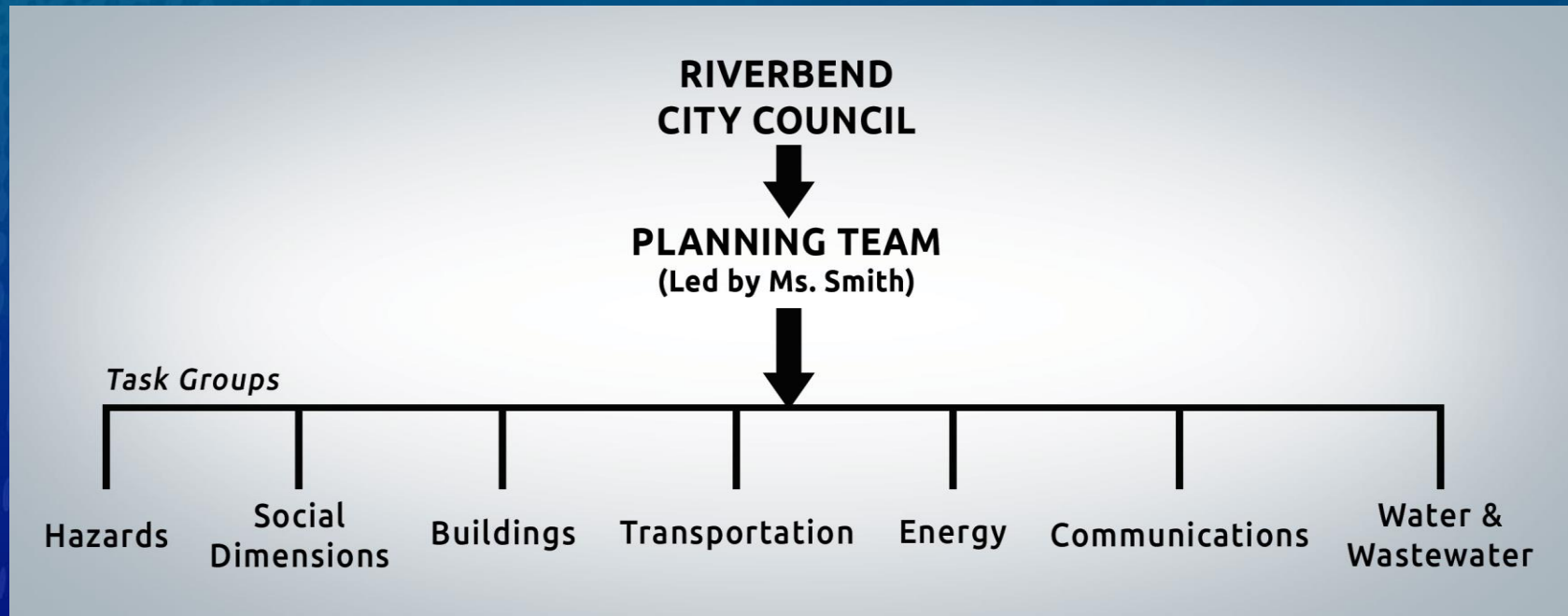


Riverbend, USA

- City situated along Central River
 - Across river from another city, Fallsborough
- Population: 50,000 people
- Has its own unique history and experiences, population and social needs, economic drivers, and in turn – its own plan to achieve resilience
- The plan began with a **champion for resilience** who recently moved to Riverbend after experiencing a disaster event



Step 1: Form a Collaborative Planning Team (Chapter 2)



Planning Team

- Resilience Lead (Ms. Smith)
- City Manager
- City Engineer
- Public works representative
- City planner
- Riverbend Office of Emergency Management
- Land developers
- Buildings department
- Finance representative
- Community outreach/ Public information
- Representative from each task group

Buildings Task Group

- Building owners
- Critical facility managers (hospitals, schools)
- Privately owned building stock representative(s)
- Local industry facility managers
- General contractor
- Real estate representatives
- Engineers
- Developers
- Construction firms
- Fire department

Hazard Task Group

- State geological survey
- Riverbend Department of Community Development
- University hazard specialist(s)
- Flood plain manager
- U.S. Army Corps of Engineers
- Department of Environmental Protection



Transportation Task Group

Energy Task Group

Communications Task Group

Water and Wastewater Task Group



(Example shown here)

**Water and Wastewater
Task Group**

- Riverbend Department of Public Works
- Fallsborough City water engineer
- Emergency manager of Regional Fire and Rescue
- Environmental quality agency

Social Dimensions Task Group



(Examples shown here)

Family and Kinship

- Neighborhood representatives
- Citizens groups

Education

- Public schools
- Private schools
- Community college/higher education

Economic

- City Chamber of Commerce
- Retail managers
- Gas station managers
- Banking and finance sector
- Local major industries

Government

CSOs

Religious/Cultural

Health

Media



Step 2: Understanding the Situation (Chapter 3): Social Dimensions

- Riverbend's economy
 - National Aircraft Parts factory
 - Small businesses
- Demographics
 - Income: Median \$52,612
 - Age, education, unemployment rate, rate of emigration (low), population growth, % with personal vehicles
- Gov't structure: City Council, Mayor
- Information on: police/fire dpts, health system, education (public/private schools), social programs, media, community groups and activities, parks & rec program

Employment by Industry	%
Trade, transportation, and utilities	22
Government	18
Manufacturing	17
Education and health services	13
Professional and business services	8
Leisure and hospitality	8
Construction	5
Financial activities	4
Other services	3
Mining and logging	1
Information	1



*Institution A relies on Institution B for _____ (insert function here)
(fill in the table with examples of functions*)*

Institution A \ Institution B	Family / Kinship	Economic	Government
Family/Kinship		Jobs; Goods and services	Jobs
Economic	Labor supply; Customer base		
Government	Staff / employees	Local taxes	



Step 2: Understanding the Situation: Built Environment

- **Buildings:**

- Wide array of construction: e.g., single unit timber framed houses, modern steel mid-rise buildings
- Significant stock of unreinforced masonry buildings in downtown area

- **Transportation:**

- Interstate freeway
- State, county, local roadways – public transport options, most rely on personal vehicles
- Regional airport (30 miles away) – limited commercial service
- Freight rail line
- *4-lane interstate bridge crossing Central river**



Step 2: Understanding the Situation: Built Environment, cont.

- **Energy:**
 - Riverbend Gas and Electric provides power and natural gas
 - Liquid fuel is transported to Riverbend
 - Electric power via overhead transmission lines – *Central River*
- **Communications:**
 - Two companies provide Internet, cellular and landline, cable (one national, one regional)
 - Share infrastructure
- **Water and wastewater:**
 - Drinking water from neighboring city
 - Riverbend relies on county services to treat sanitary sewage and storm water
 - *Water line from neighboring city via Central River bridge*



Step 2: Understanding the Situation: Linking the Social and Built Envs

	Purpose of BE within each Social Institution	How Actualized within Built Environment	Possible Impacts if BE are Damaged	
			Direct	Indirect
Family				
Economic				
Government				
Health				
Education				
CSO				
Religious Org				
Media				



Example of Transportation Table (Economics Row)

	Purpose of Transportation within each Social Institution	How Actualized within Built Environment	Possible Impacts if Transportation Systems are Damaged	
			Direct	Indirect
Economic	<ul style="list-style-type: none"> • Distribute goods for processing • Obtain labor and capital • Distribute intermediate goods • Distribute final goods for sale • Bring sellers (providers) and consumers together • Getting to and from work 	<ul style="list-style-type: none"> • 1 Interstate road • 1 freight rail line • 1 bridge for vehicular traffic • Regional airport 	<ul style="list-style-type: none"> • Supply chain disruptions • Loss of employment • Increase in commuting time and costs • Consumers unable to obtain goods and services 	<ul style="list-style-type: none"> • Loss of taxes, market share • Price increases



Step 2: Understanding the Situation: Building Clusters

Buildings in Clusters	
Critical Facilities	Housing/Neighborhoods/Business
<ol style="list-style-type: none">1. Police and Fire/EMS Stations2. Emergency Operations Centers3. Memorial Hospital and Urgent care facilities, including pharmacies4. Disaster Debris and Recycling Centers5. National Aircraft Parts Factory	<ol style="list-style-type: none">1. Waste Management Facilities2. Schools3. Medical Provider Offices4. Downtown District5. Local Businesses outside of the downtown area6. Daycare Centers7.
Emergency Housing	Community Recovery
<ol style="list-style-type: none">1. Residential Shelter-in-Place2. Food Distribution Centers3. Animal Shelters4. Gas Stations5. Banking Facilities6.	<ol style="list-style-type: none">1. Residential Housing2. Commercial and Industrial Businesses, except National Aircraft Parts Factory3. Non-Emergency City Services4. Resilient Landscape Repair, Redesign, Reconstruction, and Repairs ...



Step 3: Determine Goals and Objectives (Chapter 4)

- Establish Long-Term Community Goals
 - Minimizing disruptions to daily life and commerce
 - Metric: Average commute time
 - Stabilizing employment and attracting new businesses to support economic growth
 - Metrics: Jobs added; tax base value
 - Strengthening ability of government and critical facilities to function after hazard events
 - Metrics: Government services outages (number); disaster response drill performance; emergency response time



Step 3: Determine Goals and Objectives

- Long-term community goals
- For example,
 - Minimizing disruptions to daily life and commerce
- High level goals for event
 - For an expected event, the city should:
 - Meet its social needs within 1-12 weeks (i.e., intermediate term)
 - Complete reconstruction projects within two years of the event



Step 3: Define Performance Goals and Anticipated Performance

Functional Category: Cluster	(4) Support Needed	Overall Recovery Time for Hazard and Level Listed Expected Hazard Level								
		Phase 1 – Short-Term			Phase 2 -- Intermediate			Phase 3 – Long-Term		
		Days			Wks			Mos		
		0	1	1-3	1-4	4-8	8-12	4	4-24	24+
Ingress (goods, services, disaster relief)										
Local Roads, Bridges, and Tunnels										
State Highways, Bridges, and Tunnels										
National Highways, Bridges, Tunnels										
National/International Airport										
Ferry Terminal										
Subway Station										
Rail Station, National										
Egress (emergency egress, evacuation, etc)										
Same list as Ingress...										
Community resilience										
Critical Facilities										
Hospitals										
Police and Fire Stations										
Emergency Operational Centers										



Step 3: Determine Goals and Objectives

– Desired Performance Goals

Functional Category: Cluster	(4) Support Needed	Overall Recovery Time for Hazard and Level Listed Expected Hazard Level								
		Phase 1 – Short-Term			Phase 2 -- Intermediate			Phase 3 – Long-Term		
		Days			Wks			Mos		
		0	1	1-3	1-4	4-8	8-12	4	4-24	24+
Ingress (goods, services, disaster relief)										
Local Roads	R, S	60%	90%							
State Highways and Bridge	R, S	60%	90%							
Regional Airport	R, S		30%	60%	90%					
Egress (emergency egress, evacuation, etc)										
Local Roads	R, S	60%	90%							
State Highways and Bridge	R, S	60%	90%							
Regional Airport	R, S		30%	60%	90%					
Community resilience										
Critical Facilities										
Hospitals	R, S	60%	90%							
Police and Fire Stations	R, S	60%	90%							
Emergency Operational Centers	R, S	60%	90%							

Shows only a portion of the Transportation matrix (expected hazard)



Step 3: Determine Goals and Objectives – Define Hazards

- Hazard task group reviewed existing hazard risk maps and historical data from events in Riverbend
- Main hazards: earthquake and flooding

Hazard	Routine	Expected	Extreme
Earthquake	72-year	500-year	2,500-year
Flooding	50-year	100-year	500-year



Step 3: Determine Goals and Objectives

– Anticipated Performance

Functional Category: Cluster	(4) Support Needed	Overall Recovery Time for Hazard and Level Listed Expected Hazard Level								
		Phase 1 – Short-Term			Phase 2 -- Intermediate			Phase 3 – Long-Term		
		Days			Wks			Mos		
		0	1	1-3	1-4	4-8	8-12	4	4-24	24+
Ingress (goods, services, disaster relief)										
Local Roads	R, S	60%	90%	X						
State Highways and Bridge	R, S	60%	90%		X					
Regional Airport	R, S		30%	60%	90%		X			
Egress (emergency egress, evacuation, etc)										
Local Roads	R, S	60%	90%	X						
State Highways and Bridge	R, S	60%	90%		X					
Regional Airport	R, S		30%	60%	90%		X			
Community resilience										
Critical Facilities										
Hospitals	R, S	60%	90%	X						
Police and Fire Stations	R, S	60%	90%	X						
Emergency Operational Centers	R, S	60%	90%	X						

Shows only a portion of the Transportation matrix (expected earthquake hazard)



Step 3: Determine Goals and Objectives – Summarize Results

Functional Category: Cluster	Overall Recovery Time for Hazard and Level Listed Expected Hazard Level								
	Phase 1 – Short-Term			Phase 1 – Short-Term			Phase 1 – Short-Term		
	Days	Days	Days	Wks	Wks	Wks	Mos	Mos	Mos
	0	1	1-3	1-4	4-8	8-12	4	4-24	24+
Critical Facilities									
Buildings	90%							X	
Transportation		90%	X						
Energy		90%	X						
Water			90%		X				
Waste Water				90%				X	
Communication	90%			X					
Emergency Housing									
Buildings				90%					X
Transportation			90%	X					



Step 4: Plan Development (Chapter 5)

- Evaluated gaps between desired and anticipated performance
 - Planning team identified:
 - Largest resilience gaps – buildings and water
 - Key dependencies between transportation (bridge) and water
- Identified solutions to address gaps:
 - New construction
 - Existing construction
 - Long-term administrative
 - Short-term administrative



Step 4: Plan Development – Solutions from Transportation Task Group

- Single highway bridge crossing over Central River
 - Single point of failure
 - Failure = significant disruption to commuters, transport of goods
 - Carries only water main from Fallsborough to Riverbend
 - Vulnerable to expected EQ, extreme flood
- Example new construction solutions: **Highway Bridge**
 1. Work with State DOT to seek support for second bridge crossing
 - Provides support for growth and current traffic congestion on lone bridge
 - Adds redundancy to system
 2. Existing bridge scheduled for deck replacement; opportunity to complete seismic upgrade and raise the bridge
 - Cost benefit analysis – more practical, economic to replace existing bridge at higher elevation



Step 4: Plan Development -- Additional Solutions from Task Groups

- New construction:
 - Flood protection levee
- Existing construction:
 - Restoration of wells for water supply
- Long-term administrative:
 - Buy-back program for old buildings downtown
 - Energy assurance plan
 - Seismic retrofit initiative for business downtown
- Short-term administrative:
 - Charging stations for cell phones



Step 4: Plan Development -- Priorities

- Prioritized solutions and developed a 50-year implementation strategy:
 1. Charging stations (6 months)
 2. Initiate buy-back program (within 2 years)
 3. Apply for grant for levee (within 3 years)
 4. Restore wells (3-5 years)
 5. Energy assurance (5-10 years)
 6. New bridge (5-10 years)
 7. Replace existing bridge (10-15 years)
 8. Initiate seismic retrofit program (10-15 years)



Step 5: Plan Preparation, Review, and Approval (Chapter 6)

- Riverbend plan includes:
 - Summary reports characterizing social dimensions and built environment in Riverbend
 - Tables linking social to built environments
 - List of long-term community goals and metrics
 - Summary report defining flood and EQ hazards and levels
 - Performance matrices – including desired performance goals and anticipated performance for hazard levels (and type)
 - Summary matrices
 - List of construction and administrative solutions
 - Proposed prioritization and scheduling of implementation
- 60-day public comment period, City Hall meetings, dissemination among stakeholder groups/orgs



Step 6: Plan Implementation and Maintenance (Chapter 6)

- After approval, Riverbend began implementation process
- Began engagement in longer-term solutions
- Tracked and posted progress
- Annual review and adjustment of plan



QUESTIONS?

